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URBAN PLANNING AND ECOLOGICAL ASPECTS IN THE FORMATION OF THE NATURAL LANDSCAPE ENVIRONMENT OF UZBEKISTAN

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Abstract

This article describes the factors affecting the organization of recreation centers in the mountainous regions of Uzbekistan. The effectiveness of recreation, the ease of use of the resort area and facilities, relief features, and the flow of winds were analyzed and recommendations were made to the wellness complexes. Climate-geographical factors affecting the organization of resort settlements are analyzed in depth and their specific aspects are highlighted. Rest areas in the mountainous regions of Uzbekistan were analyzed based on their functional use and natural conditions, and recommendations were made. This article can effectively benefit architects, especially landscape architects in their design and scientific work.

Keywords: Recreational facilities, Aeration, Katabatic winds, air isotherms, winter sports, ski area.

1. Introduction

Today, great importance is attached to the healthy lifestyle of the population of our Republic and its rapid improvement. In this regard, along with the large-scale reforms being carried out in our country, the attention paid to the recreation sector of the population is certainly gratifying. Formation of services in recreation and its sectors (ecological, agro, historical, extreme) in our republic, increasing the number of multi-disciplinary spa resorts, taking into account the natural and socio-economic potential of the regions, research on their specialization and improvement of the territorial structure its inadequacy prompted work on the topic "Urban planning and ecological aspects in the formation of the natural landscape environment of Uzbekistan".

Uzbekistan is a heavenly country. Every corner of it gives a person a special charm with its pleasant nature. Fergana region, which is considered the "Jewel of the East" and has received special recognition in our country for its unique nature, is distinguished from other regions by its unique scenery formed by mountains and riverbeds, and various landforms. These aspects attract the attention of any visitor and tourist [5].

The results of the study of the recreational potential of Fergana region show that the favorable conditions of Fergana are very favorable for the development of recreational activities. Especially the shores of the Syrdarya, the green areas around it, the plants scattered in the adjacent areas, the ornamental trees stretching to the sky, the medicinal herbs growing along the mountain slopes, the groves, the natural Getting to know forests, fishing farms, protected wildlife, and various natural monuments attracts not only residents of our republic, but also foreign tourists.

2. Materials and Methods

The location of Shahimardan village in the mountainous area of Fergana region and the specific features of the orography determine the difference in the aeration regimes of individual parts of Shahimardan region. The relief, which characterizes the plasticity of the earth's surface, affects the speed and direction of wind currents in the surface layer of the atmosphere. The coefficients of wind speed change depending on the shape of the relief were used to assess the wind regime in relation to the relief (slopes, influence of the slopes on the base points, relative position of individual sections of the slopes, etc.).

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The considered morphological features have a great influence on the change of the initial wind speed recorded in the data of the meteorological station. The above-mentioned katabatic winds of the foothills formed in deep mountain areas with the cleanest air of alpine landscapes "flow" from the slopes to the valley in the early morning under the influence of mountain-valley circulation. This process can be compared to the special "rivers" of cool, clean air moistened in summer, which is important in the hot-dry climate of a number of mountain valleys in Central Asia. These "rivers" have the best disinfection properties, but this type of wind flow is easily dispersed (destroyed, fragmented) under the influence of various orographic and landscape barriers.

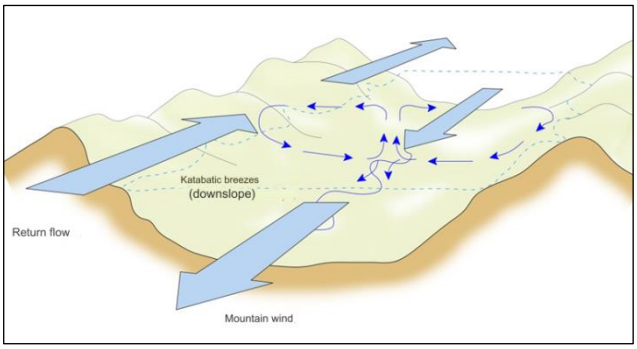


Figure 1. The scheme of movement of the katabatic wind

The territory of Shahimardan of Fergana region and its surroundings are characterized by katabatic mountain flow in the southern and southwestern directions:

- the katabatic wind is like a water current: if the slope of the earth's surface is less than 2-3%, its speed decreases sharply, so cold air “lakes” appear in the central part of Shahimardon and the southern parts of Fergana region;

- decrease of wind speed in the central part of the region due to morphological conditions occurs as a result of an increase in the length of the air mass flow line;

- the extension of the flow path contributes to the increase in the physical size of the flowing air masses, which leads to an increase in the probability of stagnation processes at the bottom of the slope along the trajectory of the wind flow in the south and southeast directions [4].

In the daily cycle, there is a significant concentration of air pollution and temperature-orographic inversions, a weak variable air layer with stable characteristics, which is clearly expressed under the influence of periodic changes of winds in opposite directions (mountain-valley circulation phenomenon). It was formed over the central area of the city (its western part). This phenomenon is later called "thermal core", its formation is caused by:

- placement of new commercial and communal warehouses in the western part of the city, which will help to increase the amount of harmful waste from automobile transport;

- a significant increase in the flow of passengers in the area of the western bus station of the city;

- features of the morphology of the studied area, which contribute to the passage of the katabatic flow of the greatest length along the slope of the northwest direction, increase the probability of stable processes in the atmosphere and the movement of the "thermal core". longer parts of the flow trajectory due to a decrease in the physical volume of the polluted air mass;

- the slope of the relief surface is less than 2%, which causes a decrease in the speed of the katabatic flow and the formation of inversion processes.

It should be noted that in recent years, the location of this thermal core has shifted to a certain extent from east to west, as well as the physical volume of the polluted air mass in the core itself has been reduced to a certain extent by the following factors:

- partial, and in some cases, complete shutdown of a number of industrial enterprises that emit harmful waste in the central and eastern industrial zones of the city;

- beautification of the eastern part of the central zone of the city and increase the level of greenery due to the placement of embassies, company offices, banks, offices and other prestigious state and private institutions here.

The study of atmospheric processes over the considered area revealed the phenomenon of temperature-orographic inversion. Inversions prevent vertical movement of atmospheric air, which creates a high potential for air pollution, and frequent calms and low (2-3 m/s) air speeds help inversions to persist.

Aeration of the urban area and the study of the interaction of wind currents with the plasticity of the relief surface in the main dominant directions:

- the location of the city in the foothills and the uniqueness of the orography determines the difference in aeration regimes in some parts of the city;

- The most favorable ventilation conditions are created on high ground with a slope of about 3% (in the southern and southeastern regions of the city). In these places with relatively good air circulation, inversion and accumulation of pollution in the surface layer of air occur to a lesser extent, because there is less stagnation in the atmosphere.

- In the central part of the city, morphological features prevent self-purification of the atmosphere. Here, the greatest decrease in the speed of wind currents is observed, which leads to stagnation in the surface layer of air and an increase in the probability of occurrence of inversions.

- The northern, northwestern and western zones of the city are characterized by orographic conditions that do not significantly affect the winds of the western direction, but prevent the entry of the most favorable winds of the southern directions. Inversion phenomena are often observed in these areas of the city, especially in winter.

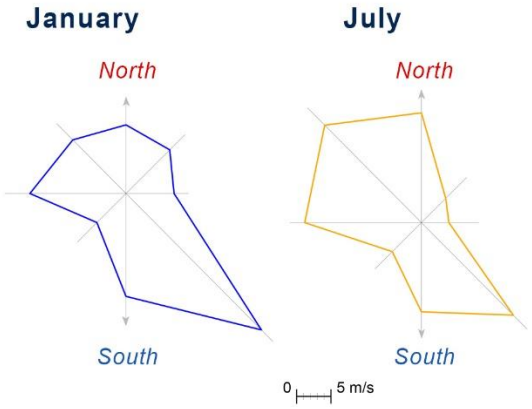


Figure 2. Architecture and climate passport of regions of Fergana region

Aeration and other climatic and ecological factors were taken into account in the development of the architectural-climatic (ecological) passport of the city (Fig. 2). This document specifies the climate and orography of the study area that should be taken into account when making urban planning, architectural planning and design decisions to improve the environment, as well as a list of climate and landscape factors, including:

- architectural climate analysis;
- engineering and physical calculations of individual climate factors;
- basic urban planning and environmental recommendations.

The basis for the development of this passport was climate-ecological characteristics processed by appropriate methods, including long-term stationary observations of the city weather station, route research data, calculations and graphic-analytical constructions.

A comprehensive climate-ecological assessment of individual areas of the city based on relief conditions, aeration schemes and types of development, a differentiated approach to the development of urban development solutions and planning restrictions should be the basis for the development and beautification of urban areas for different purposes for the city of Fergana.

3. Results

Based on the research materials of recent years, the revised document has developed recommendations on the use of urban planning tools in order to improve the urban development and ecological condition of the natural landscape environment in the Fergana region and its suburbs.

The central region of Fergana region is located on low-slope, almost flat lands; it is most sensitive to the phenomena of stagnation processes in the surface layer of the air with the largest number of inversions against the background of radiation cooling in the winter period of the year; With the presence of a "thermal core", excessive pollution of atmospheric air and soil, the weakest wind activity and other negative environmental factors make the area unfavorable for the placement of residential structures.

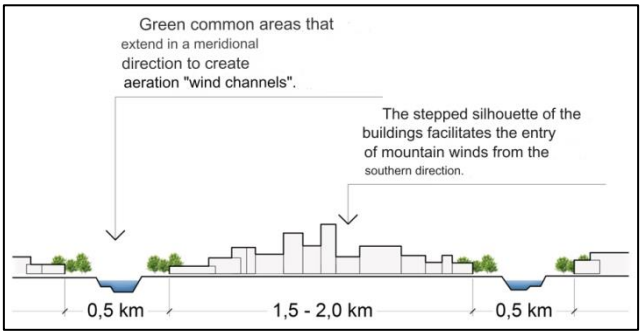


Figure 3. Scheme of linear park structures and wind channels in the meridional direction

In connection with the status of the administrative center of this area, which is considered one of the major cities of the republic, it is appropriate to place mainly business center objects: administrative, entertainment, commercial and household buildings and their complexes in its territory.

In the area where the influence of the katabatic mountain flow of the considered area is practically not manifested, it is preferable to use planning methods that encourage the movement of the wind in relation to the flows in the north and northwest direction, including:

- maximum opening of inner city spaces to the west and north-west sides of the horizon;

- increase the width of highways and wide streets on red lines to the maximum values allowed by the standards;

- development of green spaces for general use in the latitude direction, as well as along the diagonal axis “northwest, southeast”.



Figure 4. Schemes of carrying out climatic studies of Fergana city area

The following are recommended for the selection of urban planning solutions in all considered areas of the city:

- replacement of residential and green areas with the recommended ratio of the width of green (0.5-1 km) and built-up (1.5 - 3 km) areas (Figure 2.3); It is recommended to give the role of wind corridors to low-rise buildings with well-equipped cottages with landscaping and water supply.

- taking into account the direction of the opposite winds prevailing at a height of more than 50 m when locating industrial areas and reconstructing existing industrial areas; it is not recommended to place industrial facilities with harmful waste on the same width area as large residential buildings.

5. Conclusions

The interaction of favorable winds and structural elements of the environment in the placement of settlements within the framework of the plasticity of landscape and architectural planning structures located in mountain valleys, in cases where environmental disasters (landslides, floods, etc.) do not threaten the consequences of aeration flows the principle of the most convenient passage was formed.

Not only the Fergana region, but also the principles of architectural and aesthetic organization of urban development structures in the formation of cities similar to natural landscape conditions, from the appropriate models for formalizing the relief of territories and directing the "channels" of air currents flowing along the slopes. it is recommended to use it when forming all the cities of the republic.

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